



# Columbia solar cohort

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**Dr. Lori Ziolkowski (Dr. Z)**

**University of South Carolina**

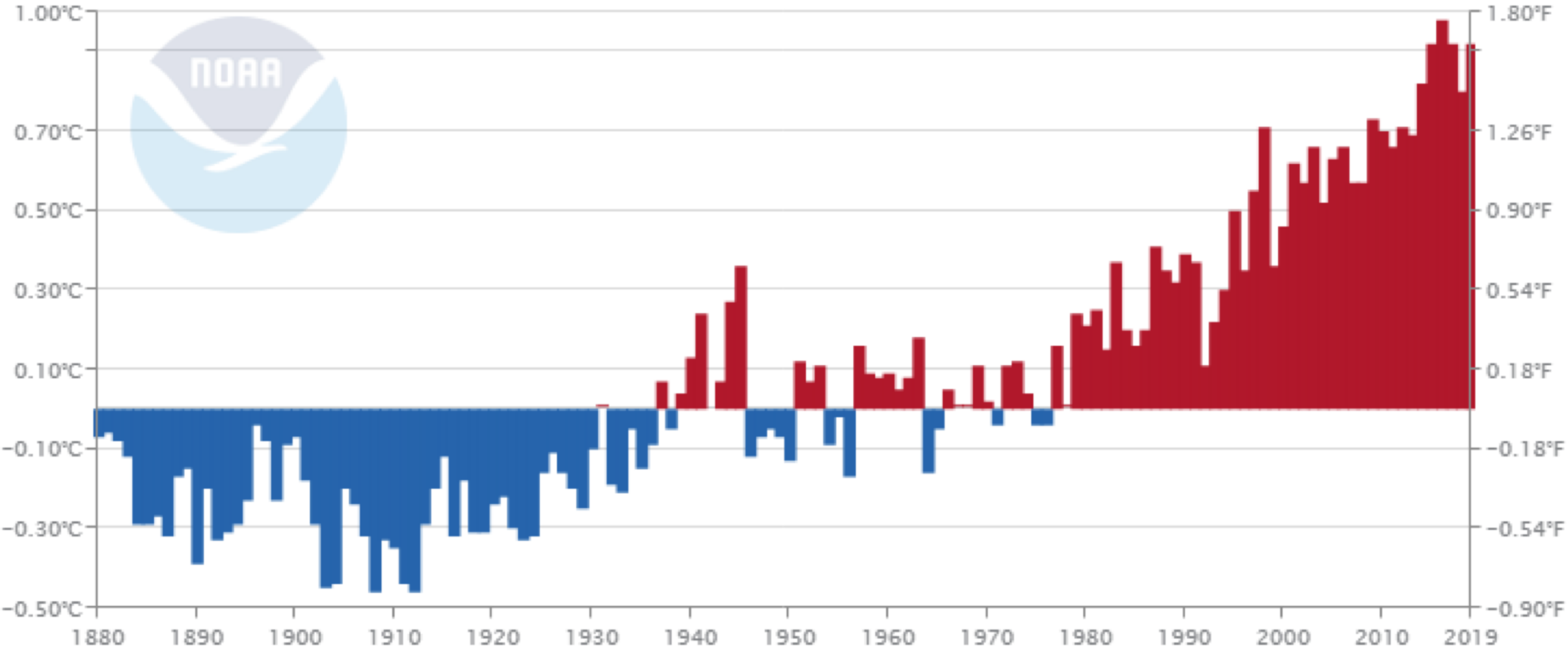
**Former chair of city of Columbia's  
Climate Protection Action Committee**

## **Key points:**

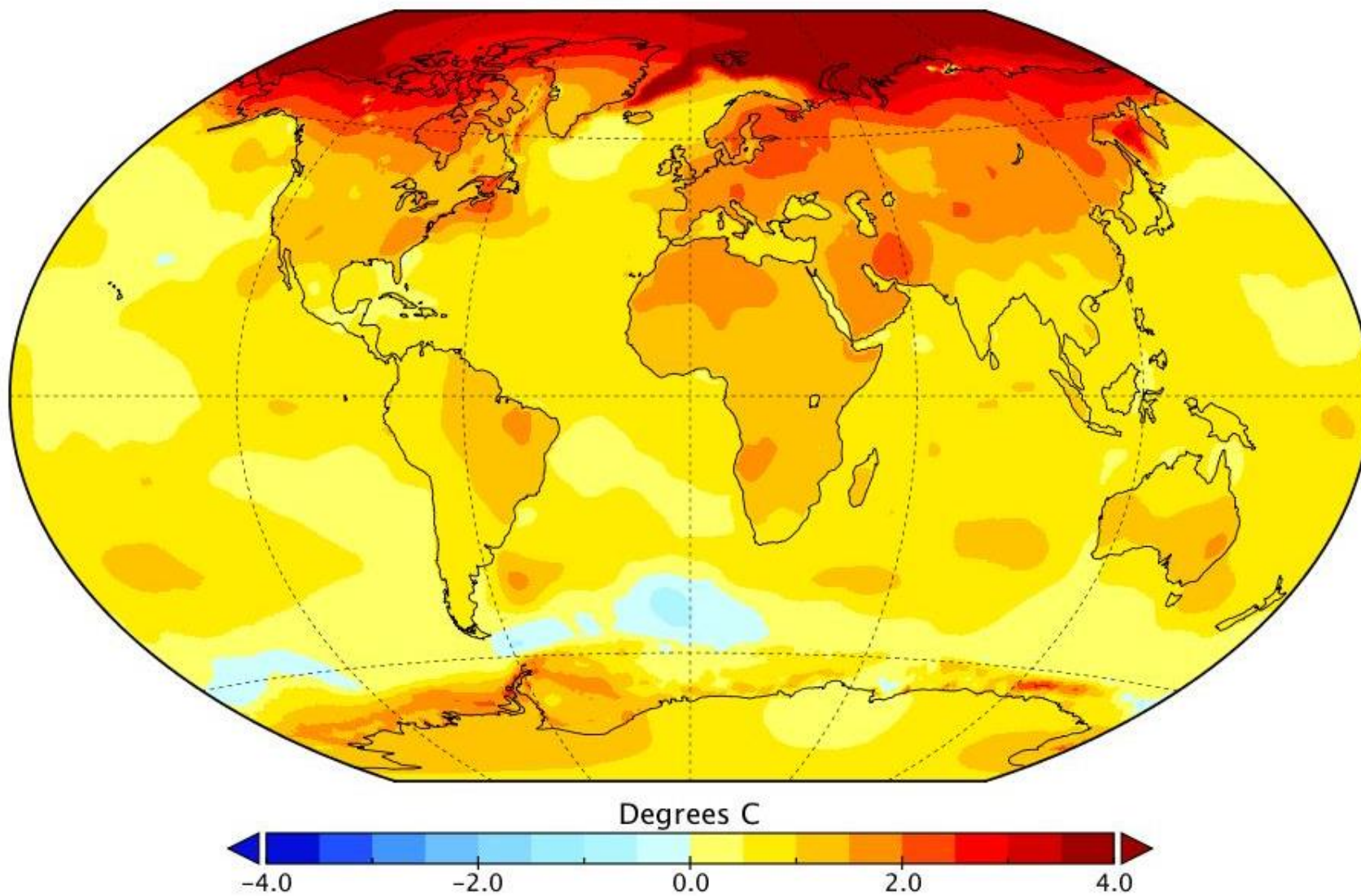
- Why – beyond the political
- Renewable procurement in SC
- Cohort training
- Columbia's progress
- Recommendations



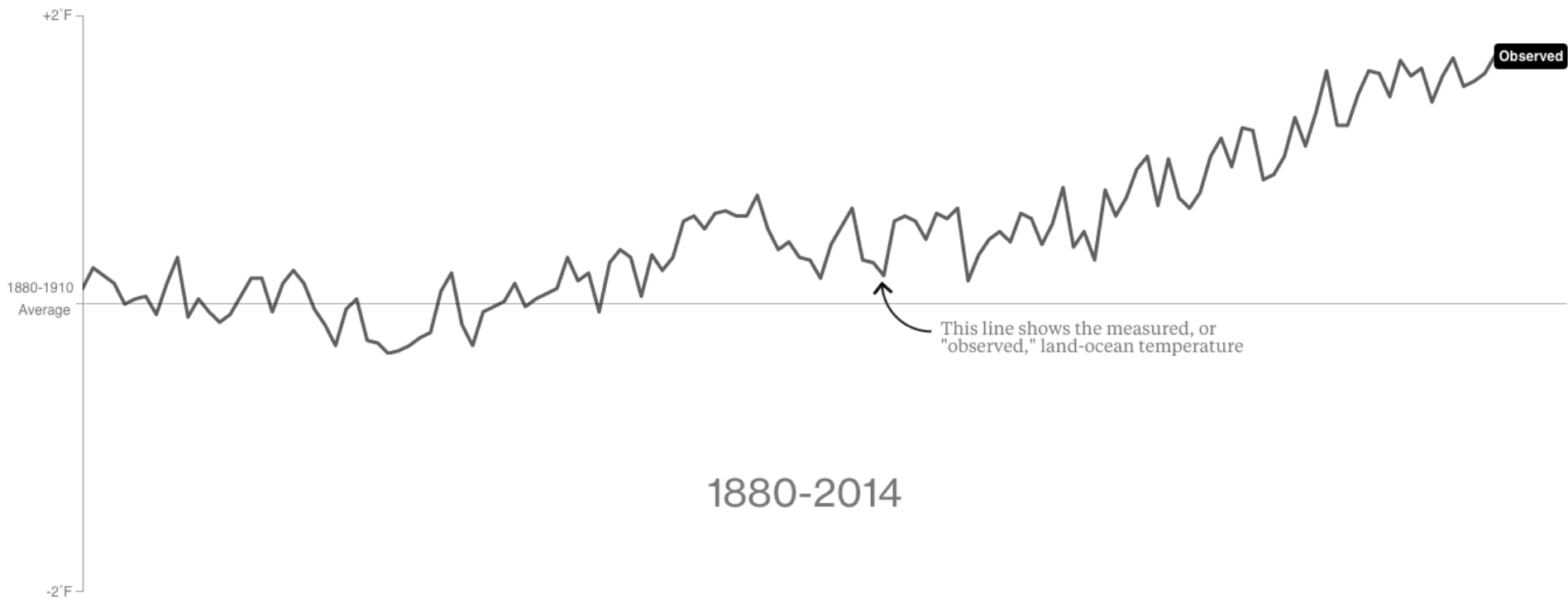
Global Land and Ocean  
August Temperature Anomalies



Warming since 1960, Berkeley Earth



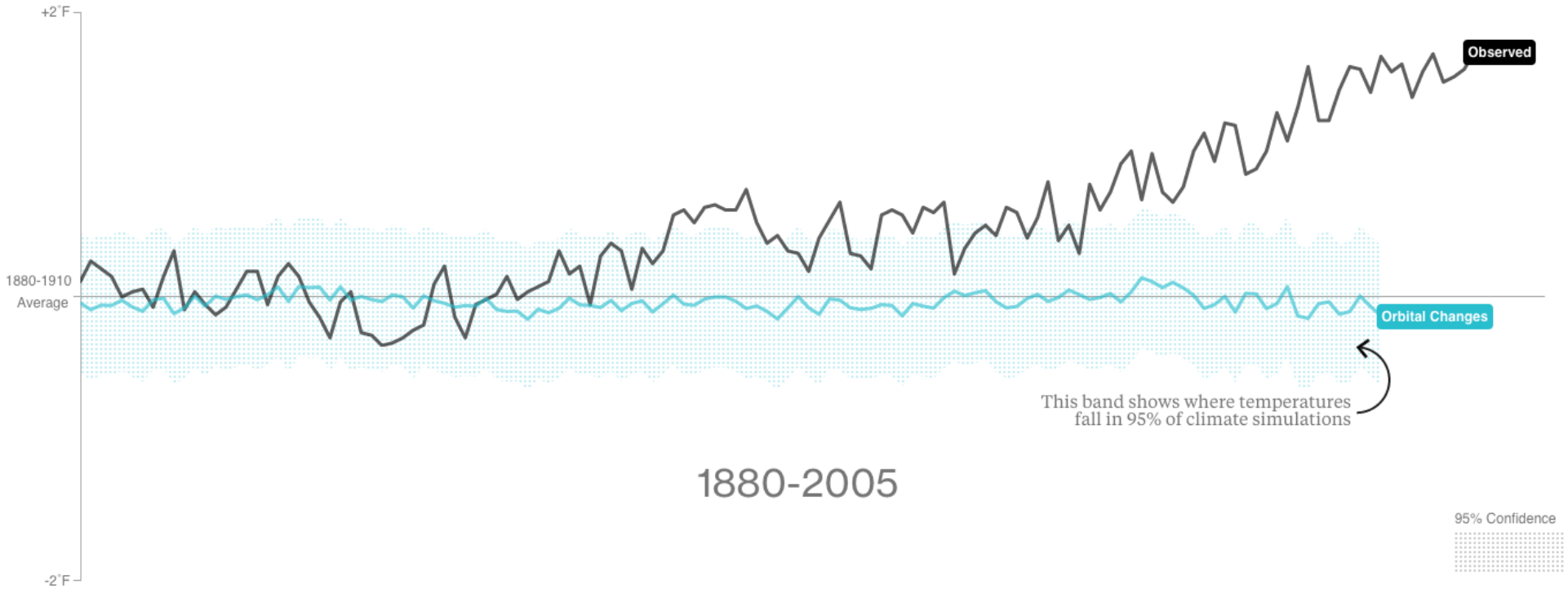
Hotter



Colder

# Is it the Earth's Orbit?

Hotter

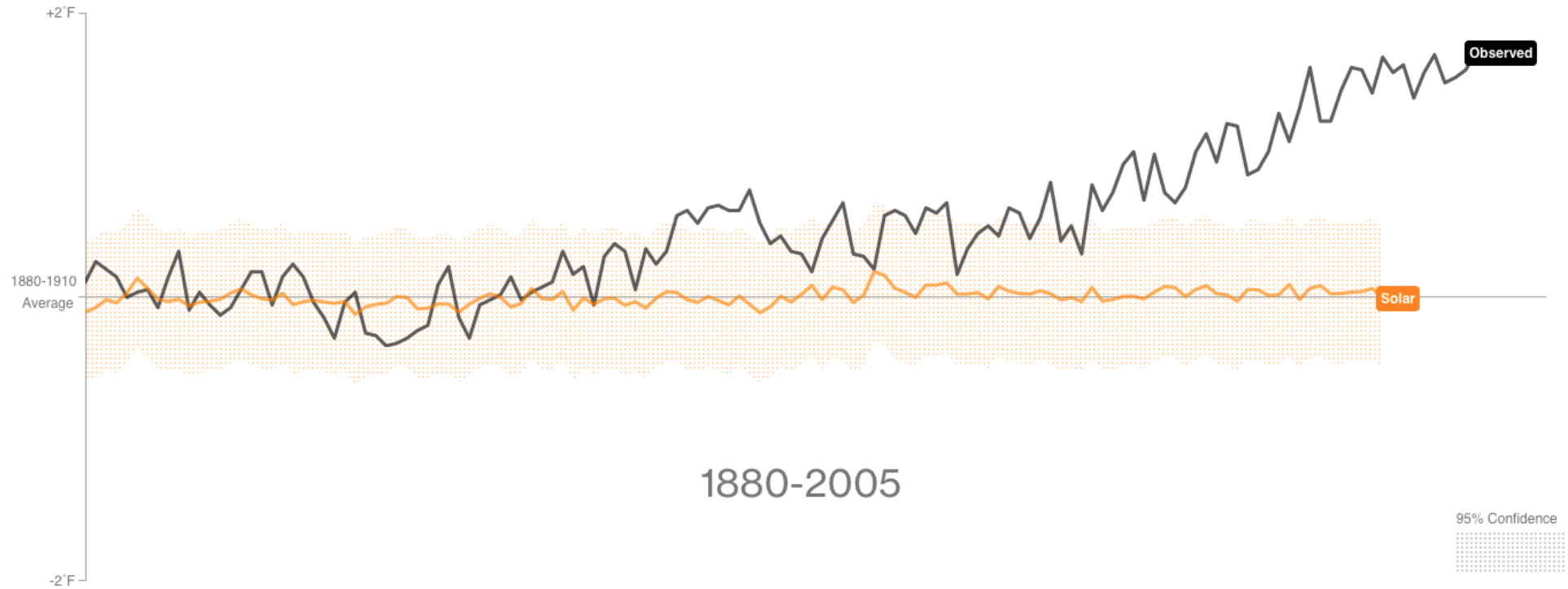


Colder



# Is it the Sun?

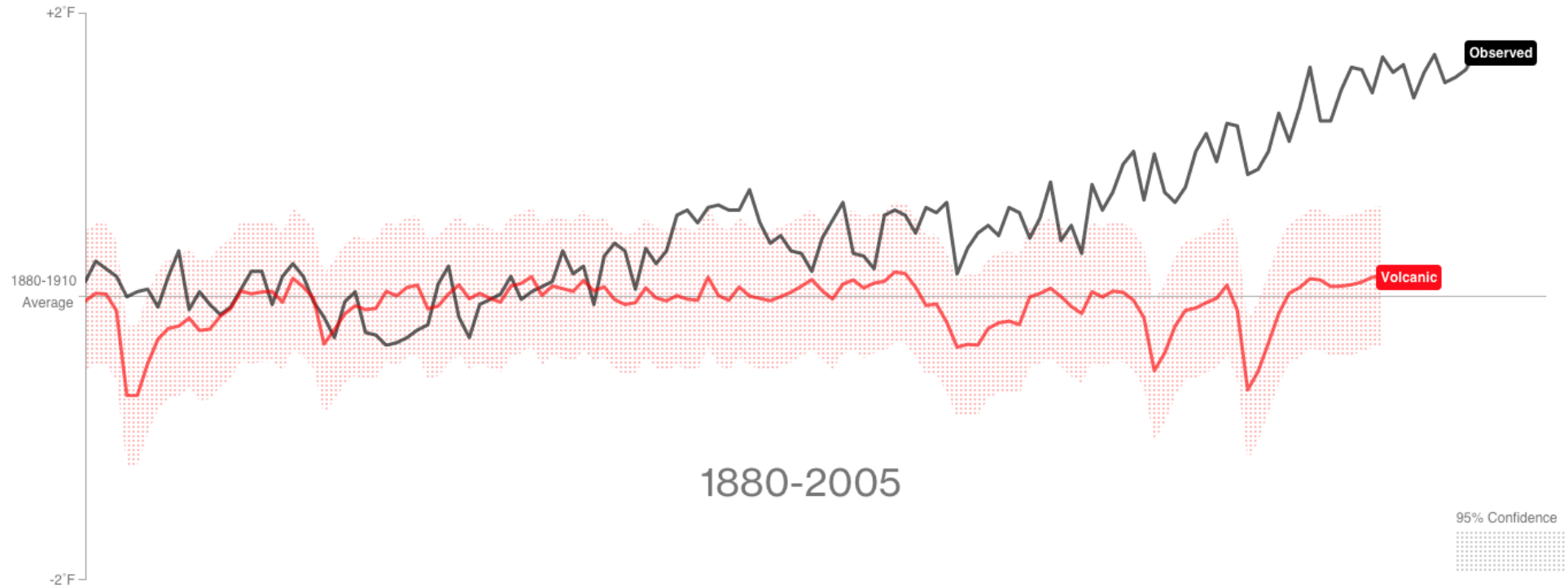
Hotter



Colder

# Is it Volcanoes?

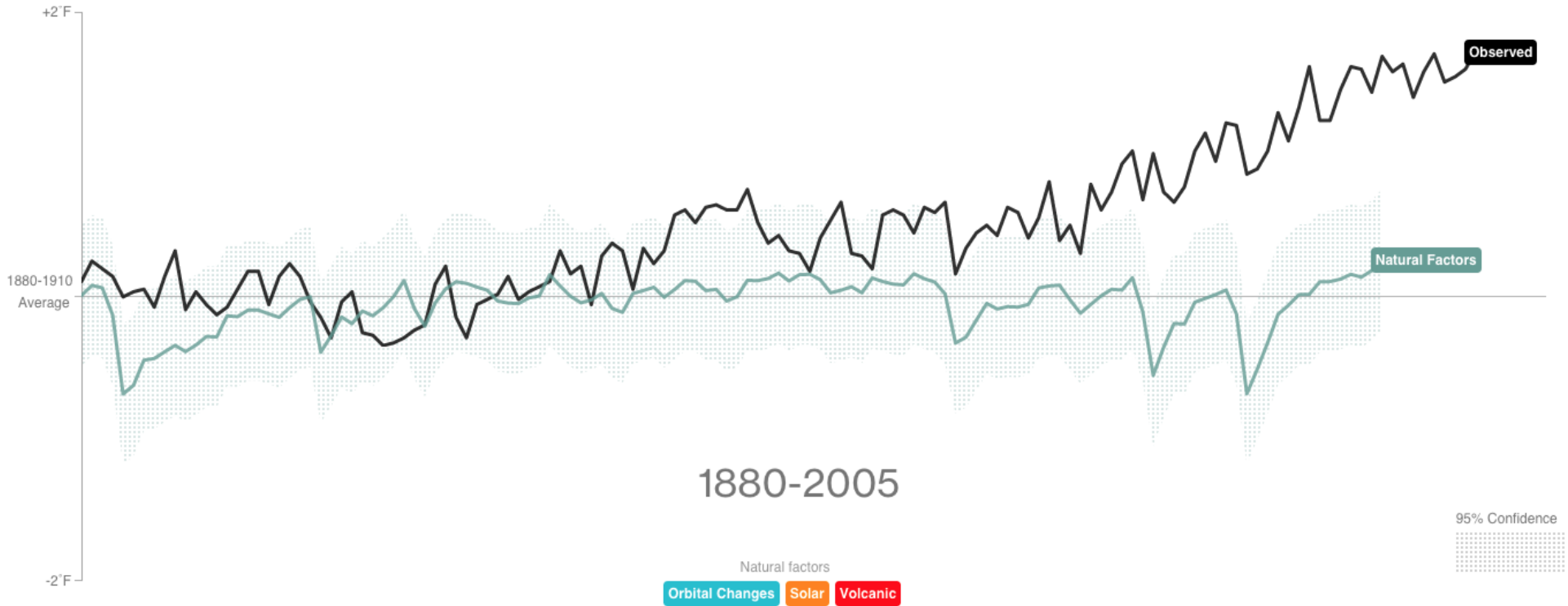
Hotter



Colder

# Is it just these natural factors?

Hotter

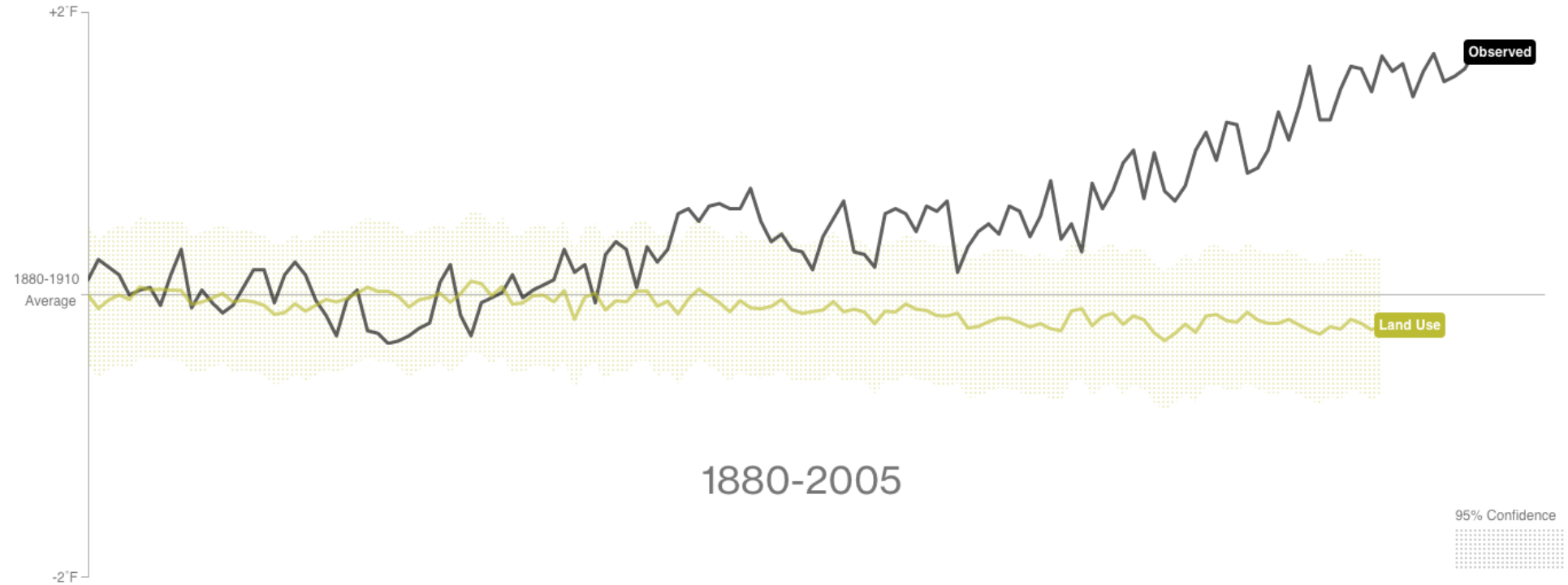


Colder



# So if it's not nature, is it deforestation?

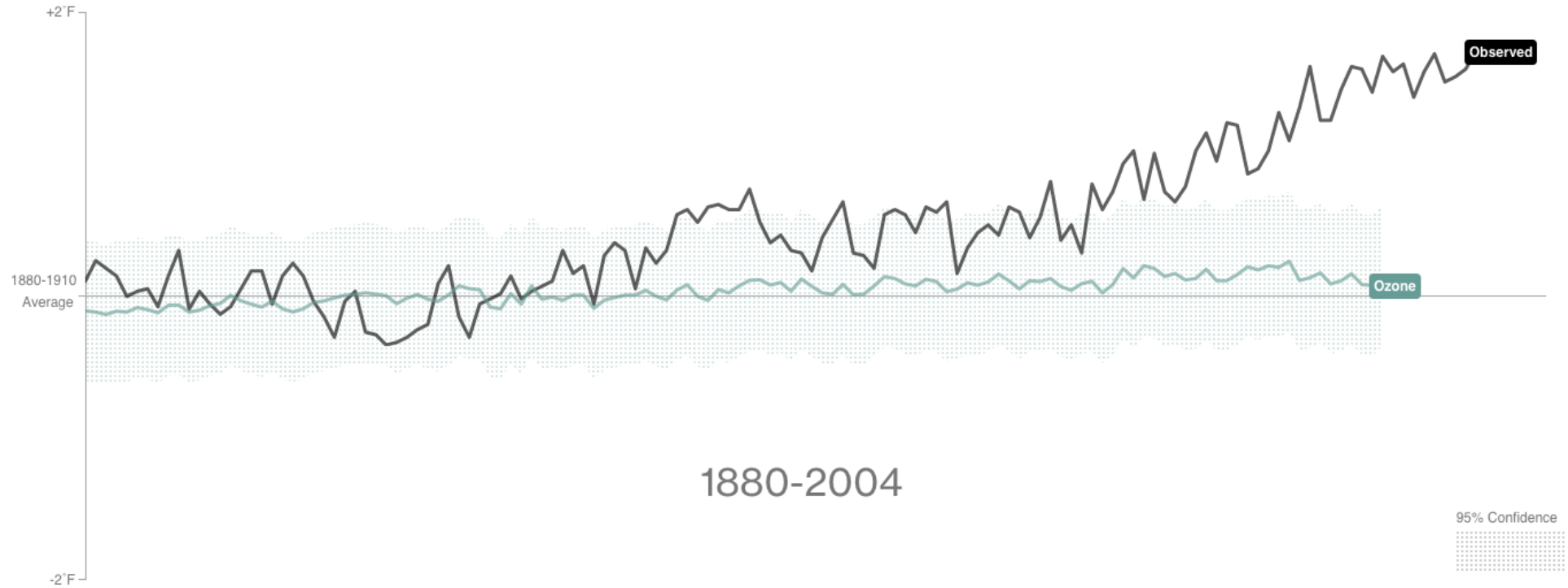
Hotter



Colder

# Or ozone pollution?

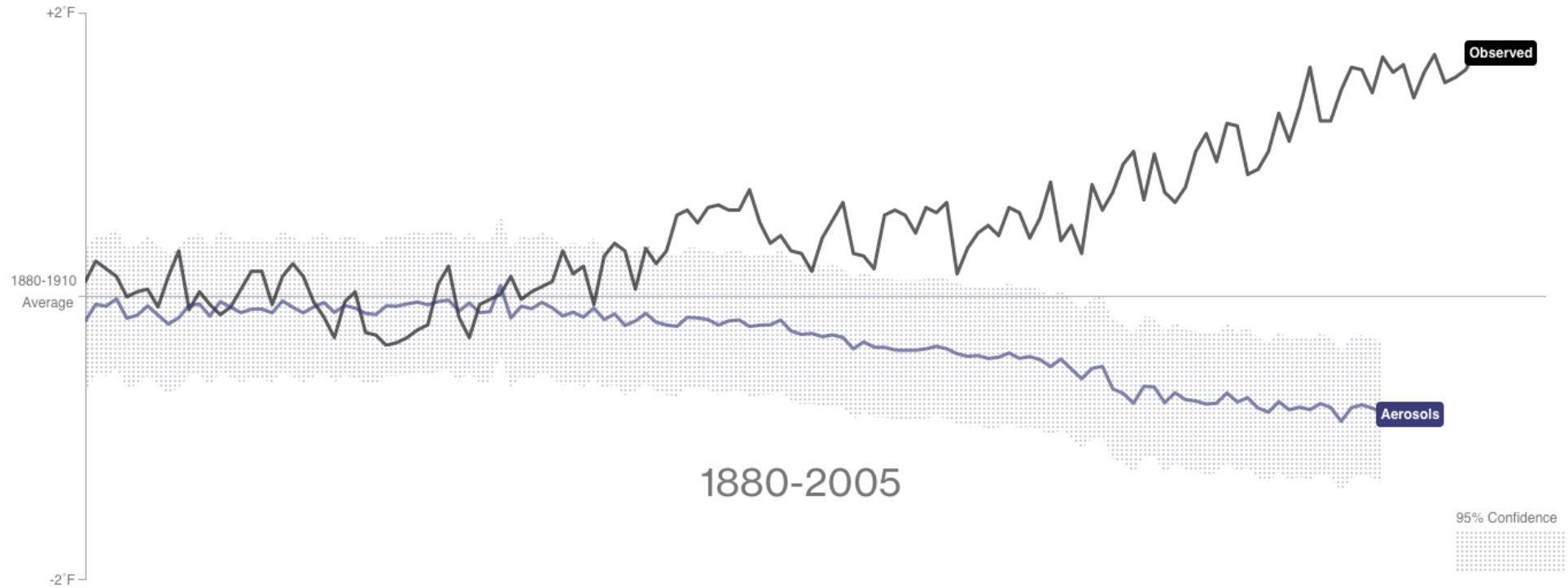
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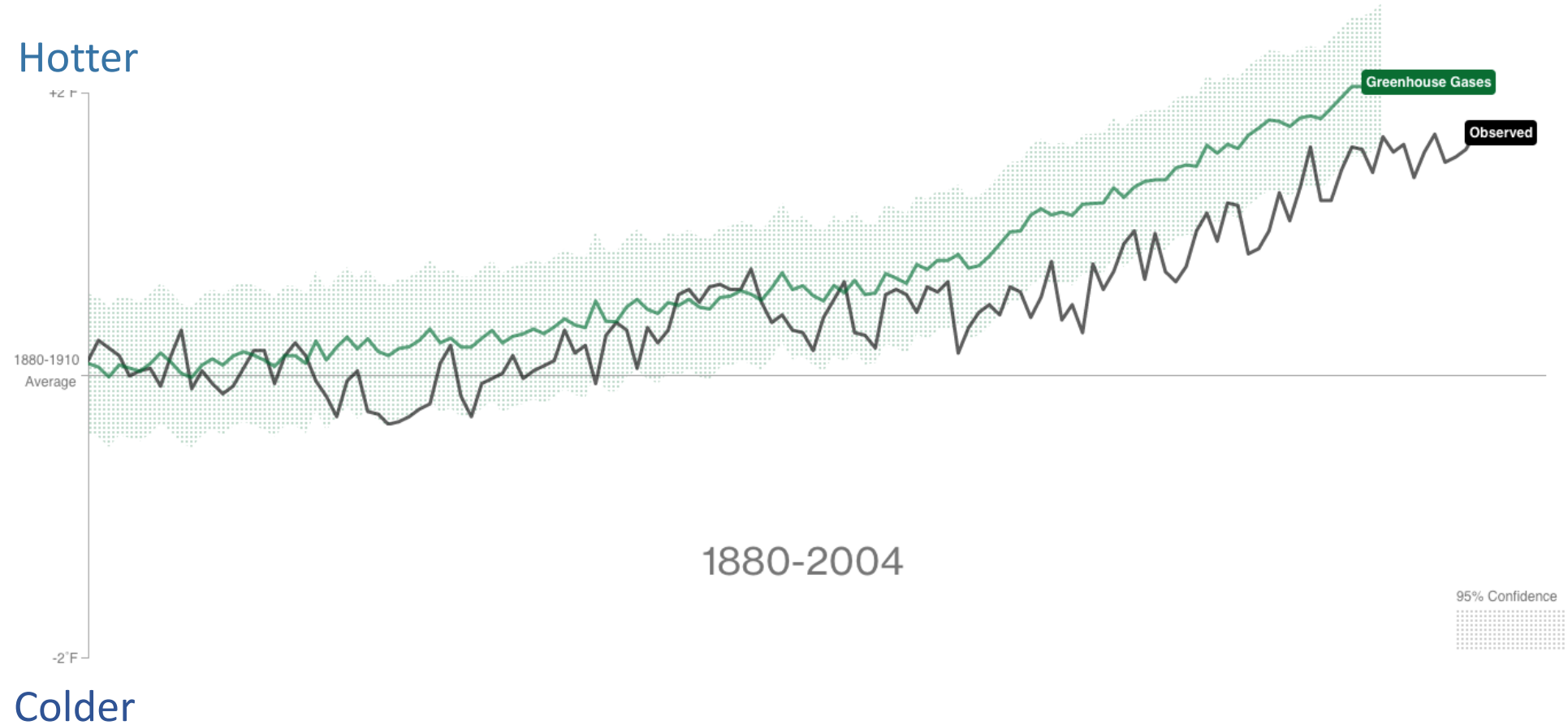
# Or aerosol pollution?

Hotter



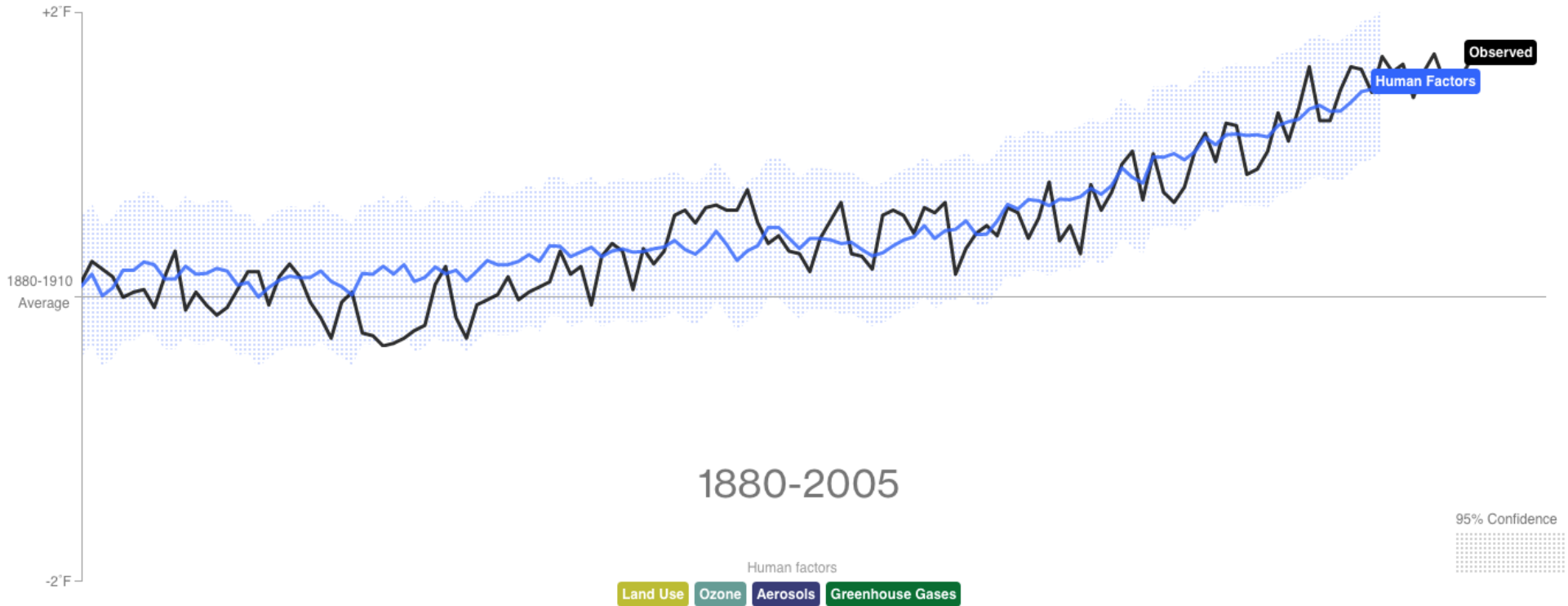
Colder

# No, it really is greenhouse gases.



# All human factors.

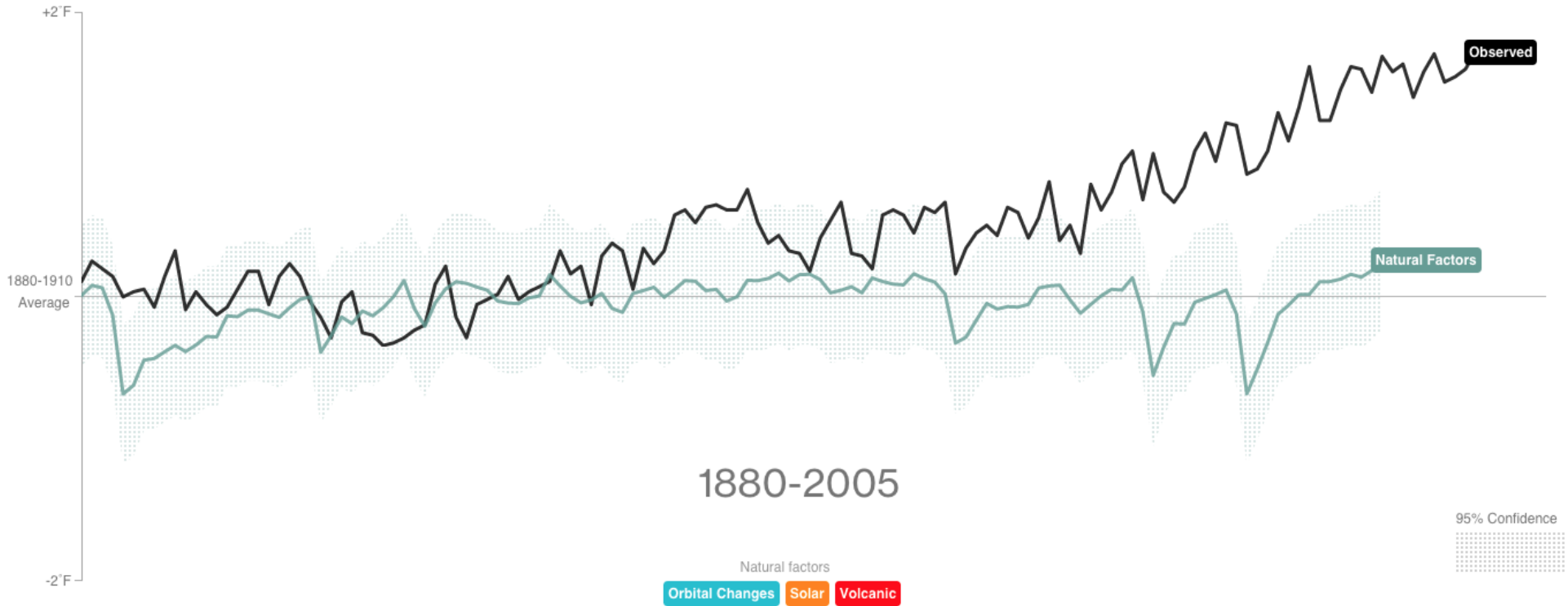
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Colder

# All natural factors

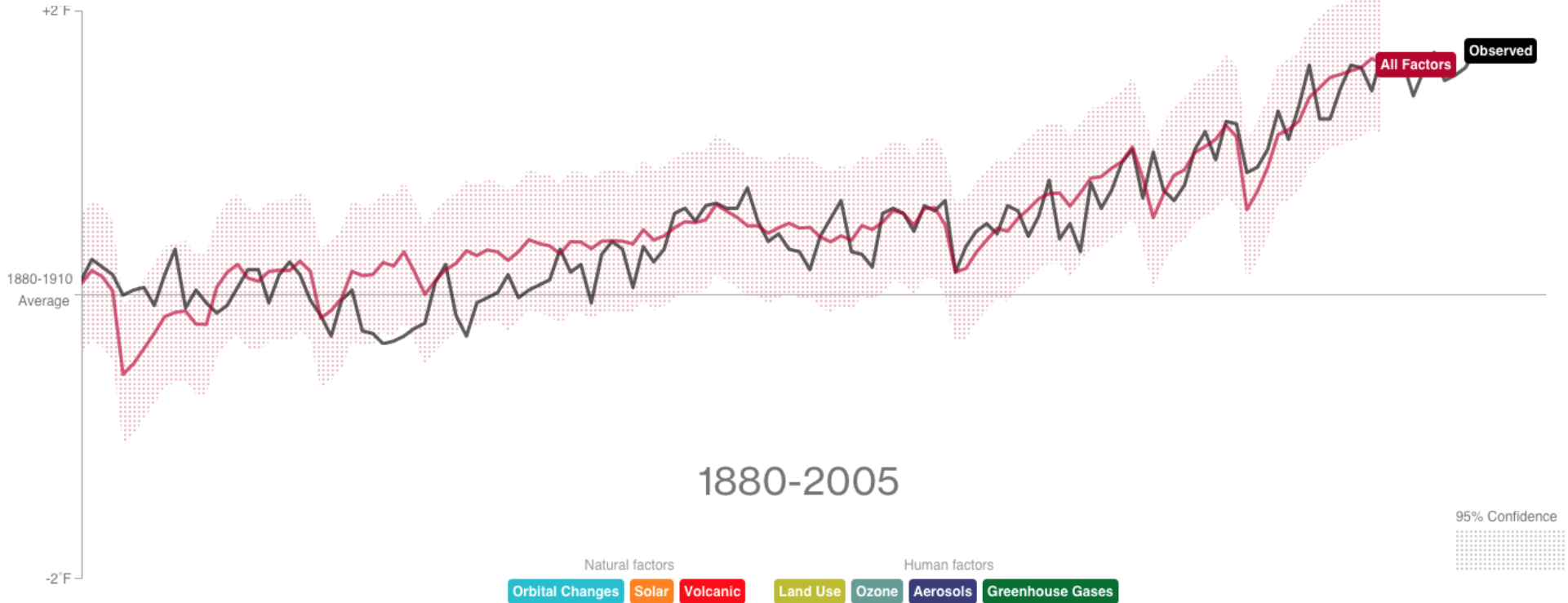
Hotter



Colder

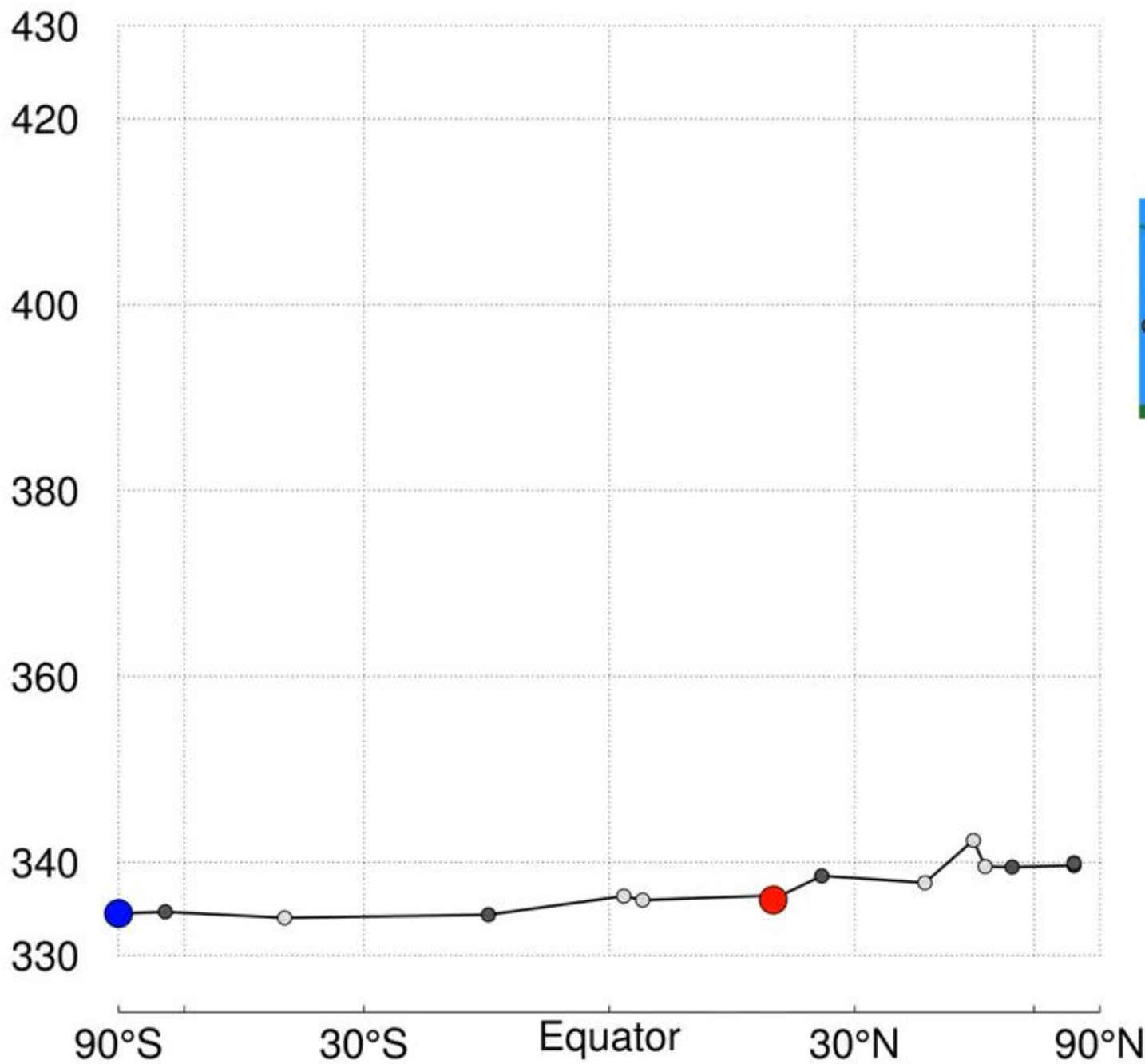
# All factors combined

Hotter



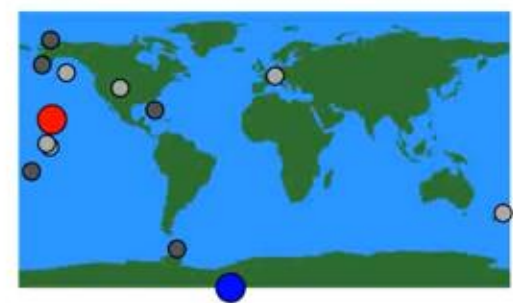
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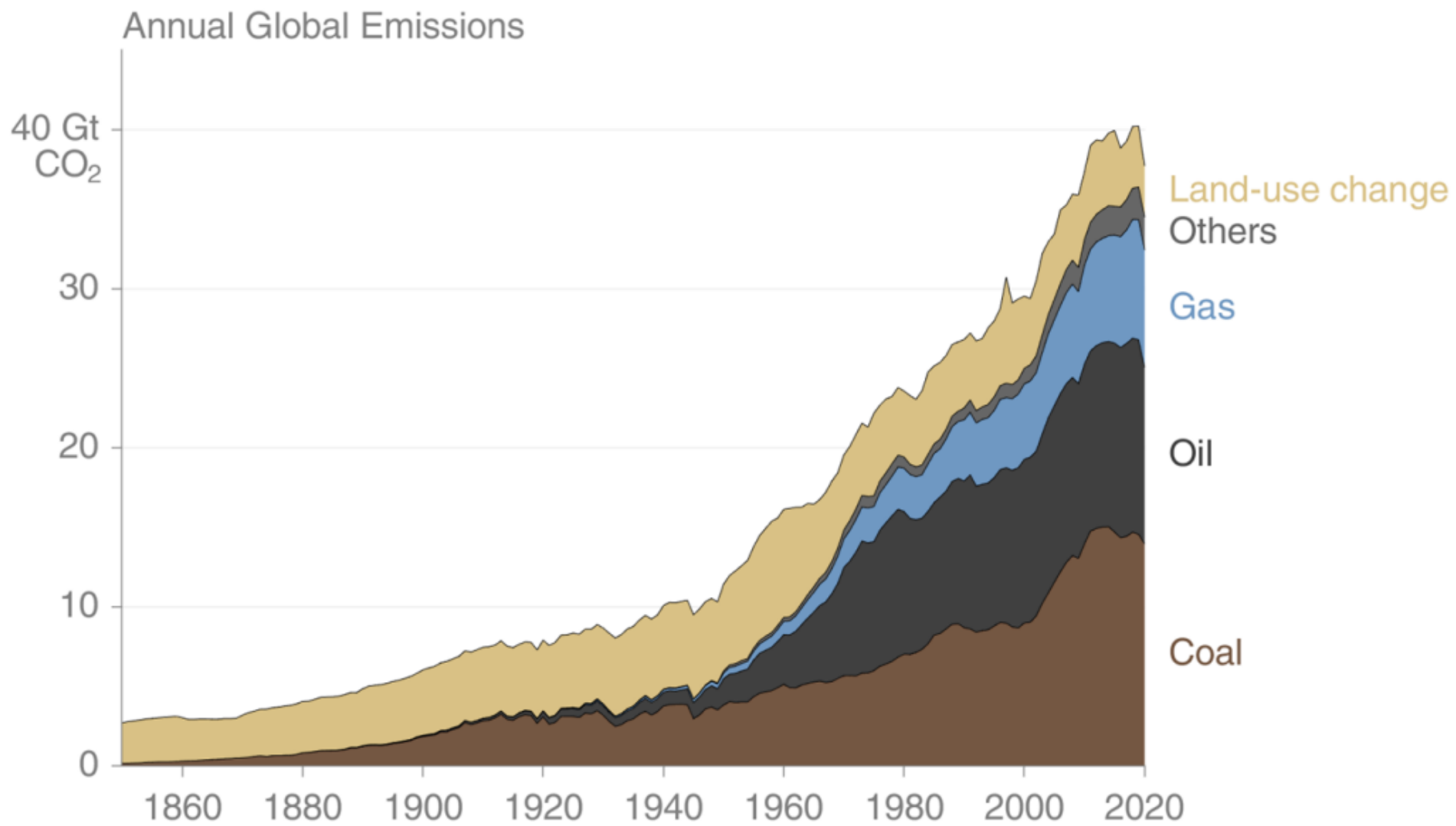


# Atmospheric CO<sub>2</sub> (ppm)

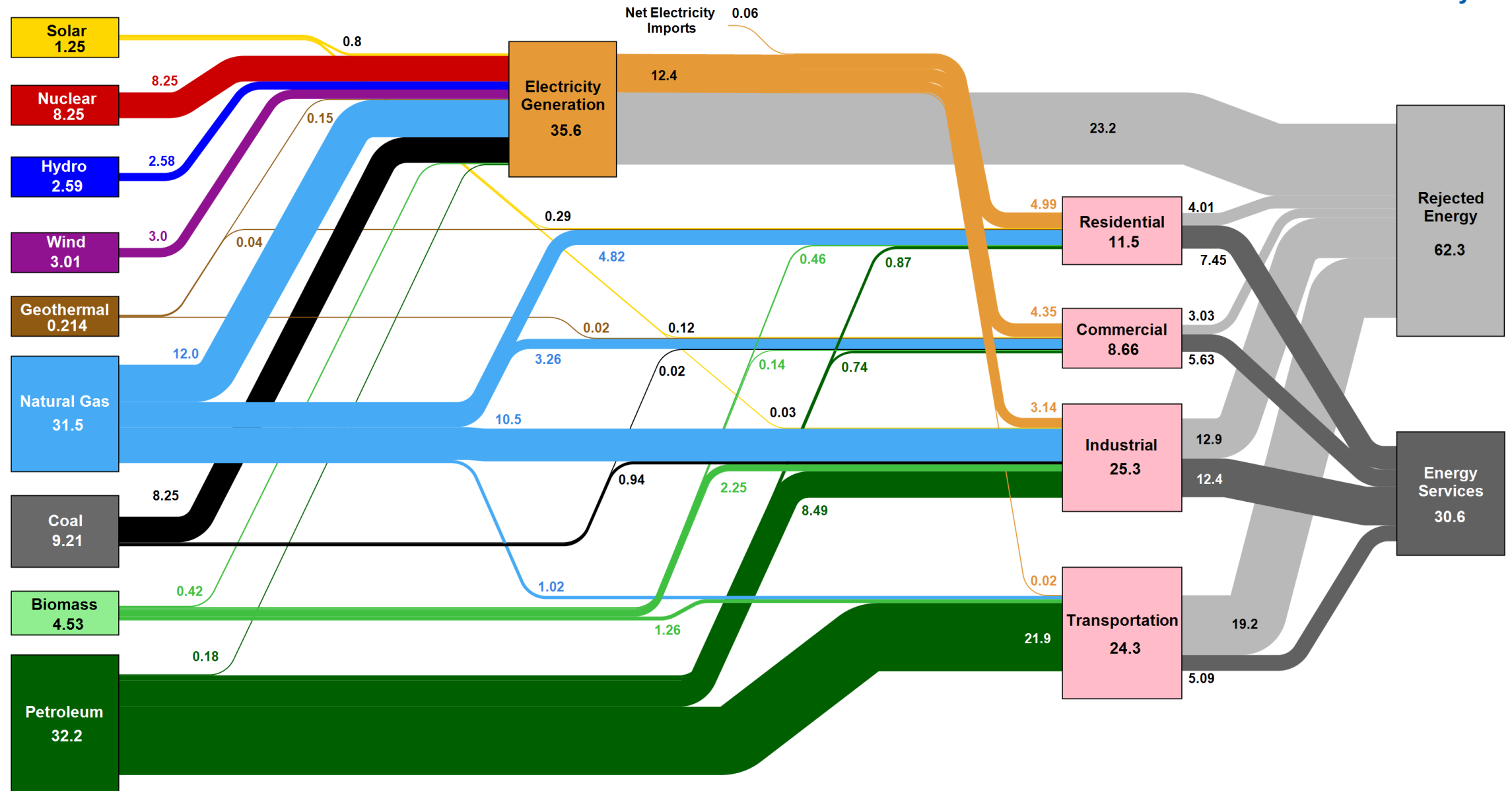
GLOBALVIEW+CO<sub>2</sub> (1979–2021); <https://gml.noaa.gov/ccgg/obspack>  
● Mauna Loa ● South Pole ● Background conditions ○ Local signals  
Contact: andy.jacobson@noaa.gov



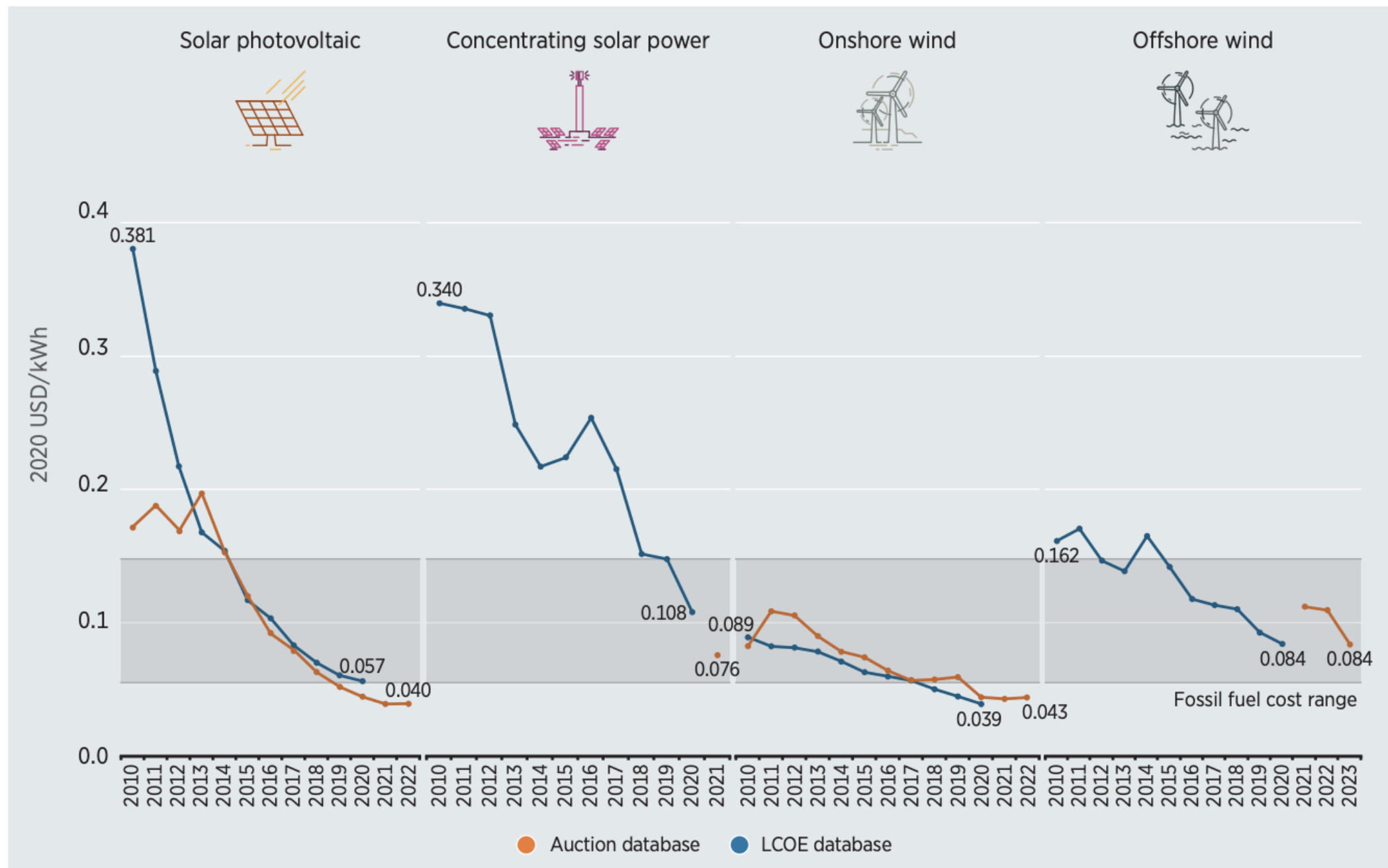
1979 1981 1983 1985



# Estimated U.S. Energy Consumption in 2020: 92.9 Quads



Source: LLNL March, 2021. Data is based on DOE/EIA MER (2020). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector and 40% for the industrial sector, which was updated in 2017 to reflect



Source: IRENA Renewable Cost Database



**2017: City of Columbia took the Ready for 100 pledge**

**The city and community, including transportation, will be powered by 100% renewable energy by 2036**

**How to achieve that goal?**

- Reduce overall energy usage
- Electrify the fleet
- Procure renewable energy





**2017: City of Columbia took the Ready for 100 pledge**

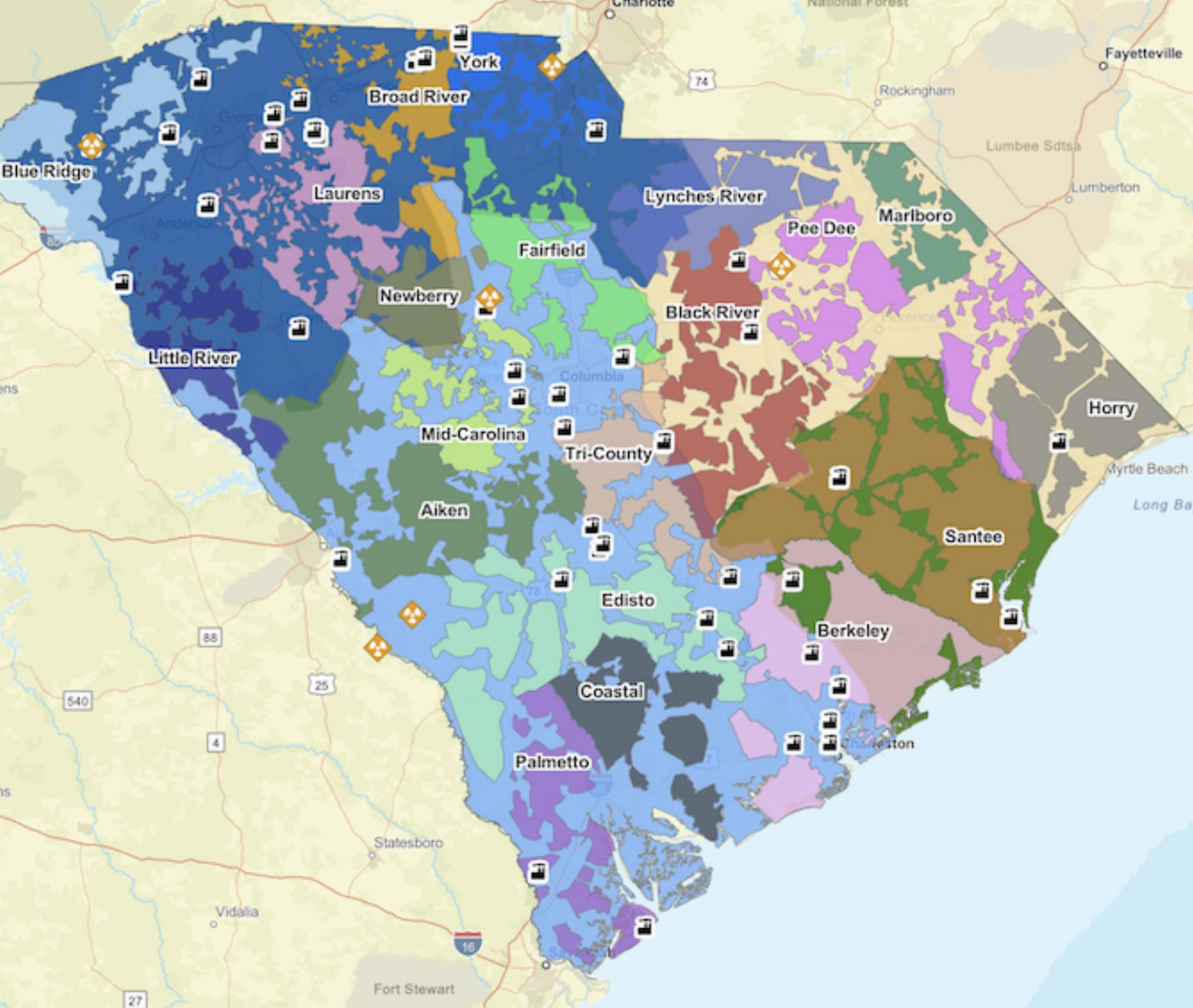
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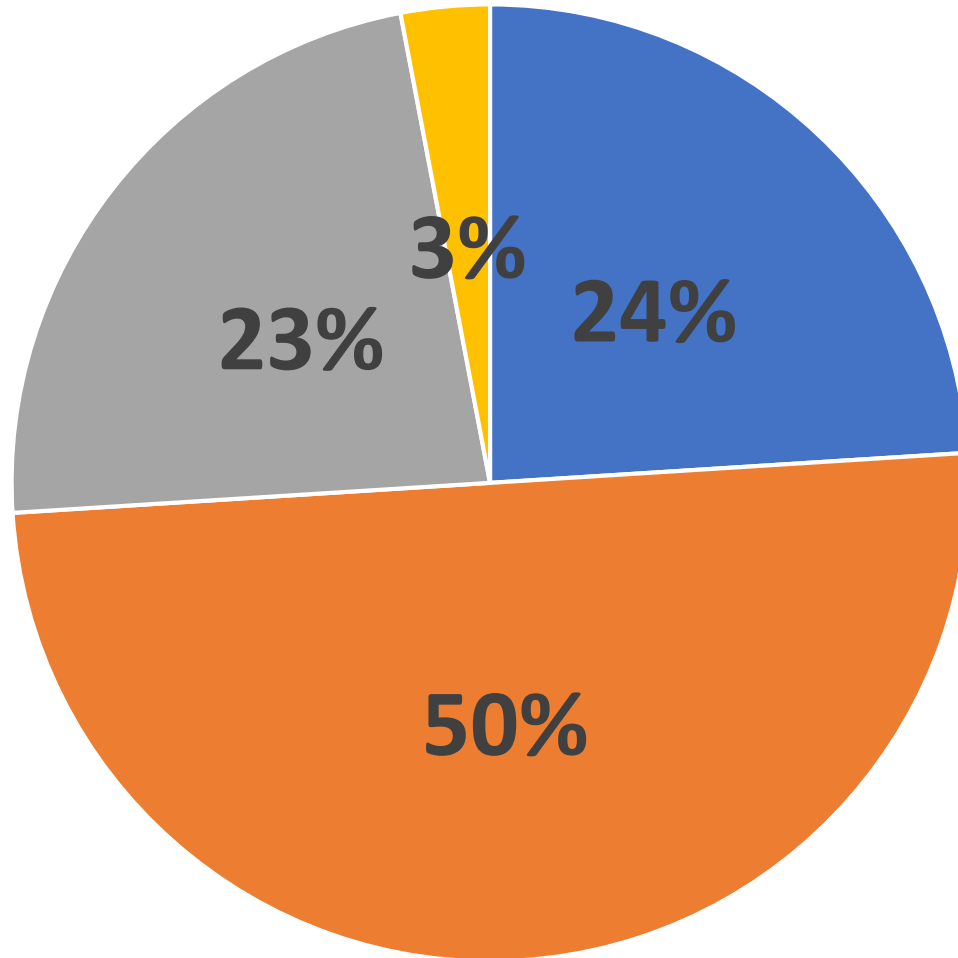


- No choice of power provider in SC
- City of Columbia is a Dominion customer
- Must source renewables via Dominion



**Today energy from Dominion  
is only 24% carbon free with  
much less renewable**

**Dominion's 2019  
power generation mix**



■ Coal ■ Natural gas ■ Nuclear ■ other

# Planning and investing for South Carolina's future.

**Integrated Resource Plan 2021 Update**

## Dominion owned solar:

400 MW currently online

+50 MW per year in 2026 & 2027

+100 MW year starting in 2030

## City of Columbia electricity use:

**93,000 MW/yr ~ 45 MW solar**

# **Enter the large-scale renewable cohort training program**

- Free year long training via WRI and RMI**



**WORLD  
RESOURCES  
INSTITUTE**



**The Leon Lowenstein  
Foundation**

**Pitched the idea to city council in mid-April 2021.  
First meeting was May 2021.**

A solid **understanding** of renewable procurement options aggregation opportunities



A **framework** for developing and running a successful aggregated procurement group



**Tools and resources** to support aggregated renewables procurement



A new **network** of colleagues who share common goals and challenges



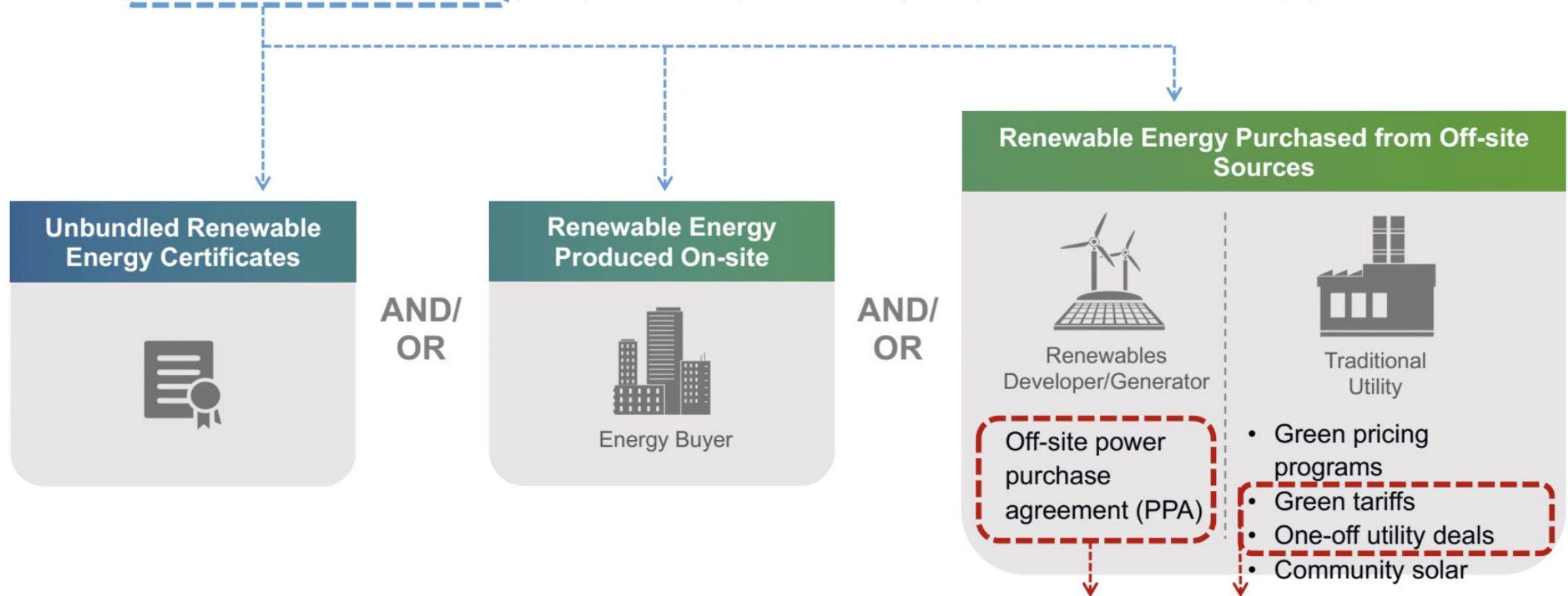






# To achieve renewables goals, organizations can buy unbundled RECs, produce clean energy on-site, and/or purchase large-scale, off-site sources

One **renewable energy certificate (REC)** = One megawatt-hour (MWh) of renewable electricity generated

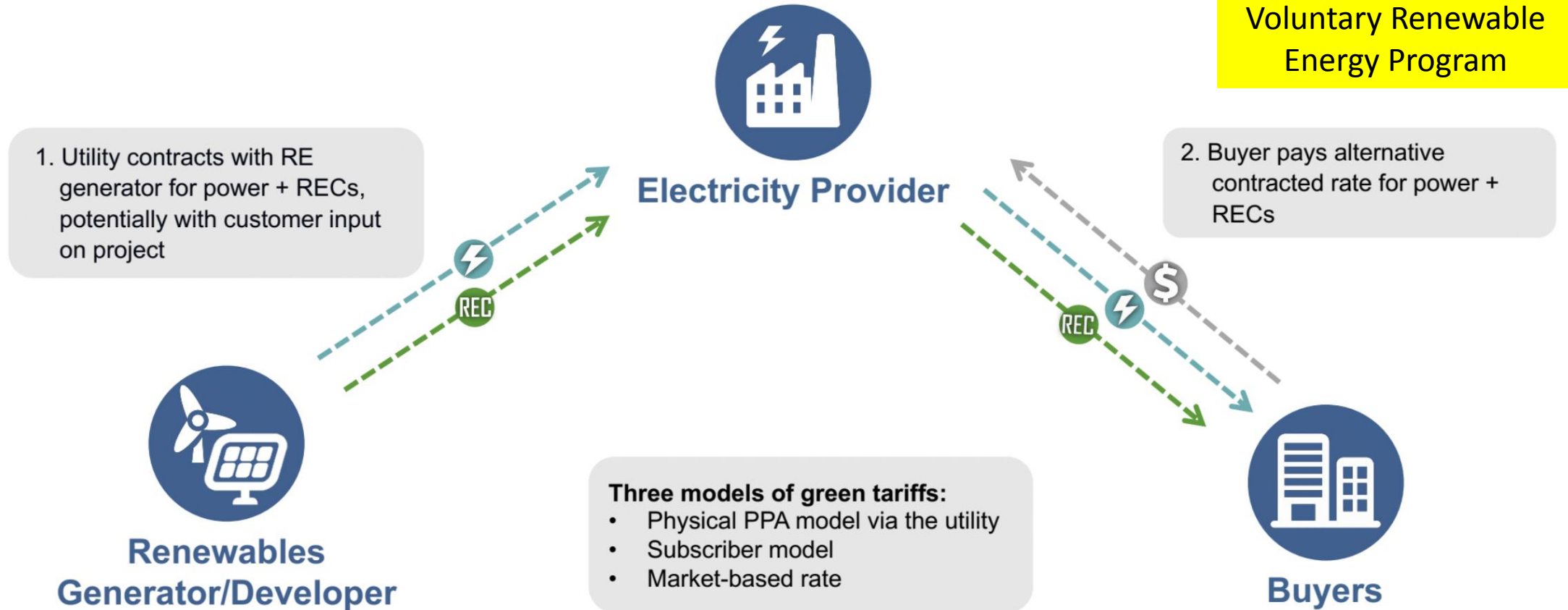


**Energy aggregation:** A group of buyers selecting suppliers together and buying electricity for their own municipal/organizational load

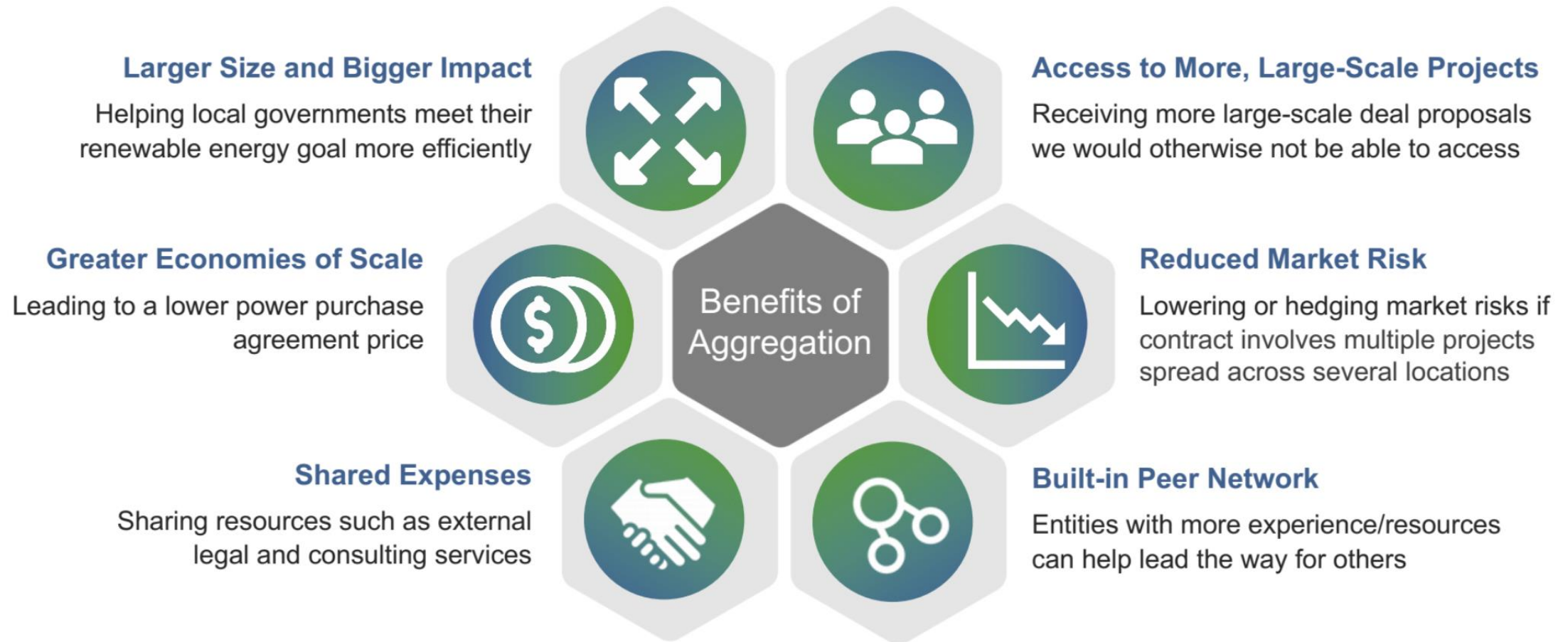


# A utility green tariff allows customers to source electricity and the associated RECs from renewables resources

**PSC 2019-209-E**  
Voluntary Renewable  
Energy Program



# Aggregating multiple buyers' load in an off-site renewable energy PPA can provide several key benefits





1. Lay the  
Groundwork in  
Each Partner



2. Form a  
Procurement  
Group



3. Align on  
Desired Project  
Details



4. Start the  
Procurement  
Process



5. Run the  
Request for  
Proposal



6. Negotiate  
and Sign  
Contracts



7. Share Your  
Success

# Step 1: Lay the groundwork in each participating organization

## 1. Lay the Groundwork

2. Form a Procurement Group

3. Align on Desired Project Details

4. Start the Procurement Process

5. Run the Request for Proposal

6. Negotiate and Sign Contracts

7. Share Success



### Key Information to Assess

- How much electricity (MWh)?
- Physical or virtual PPA?
- Commercial operation date?
- Project location?
- Level of staff commitment?
- Legal and accounting risks?



### Initial Pitch to Senior Leaders

- Climate and energy goals
- Benefits of aggregation
- Types of contracts under consideration
- Potential partners
- Actions needed



### Relevant Tools

- Aggregation Pitch Deck Template
- Aggregation Accounting Primer
- Virtual PPA Legal Considerations Primer





**CITY OF COLUMBIA**  
South Carolina



**Goal: large-scale solar development (75 to 150 MW) via  
private deal with Dominion**

## Step 1: Lay the groundwork in each participating organization

### 1. Lay the Groundwork

2. Form a Procurement Group

3. Align on Desired Project Details

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### Main deal points:

- Cost neutrality for customers
- Location in the Midlands area
- Maintenance of reliability
- Opportunities for community outreach and education

### Other considerations:

- Jobs for local residents
- Community solar for low-income renters

## Step 2: Form a procurement group

City of Columbia acting as the anchor

Different groups will choose different governance structures

1. Lay the Groundwork

2. Form a Procurement Group

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### Anchor Offtaker

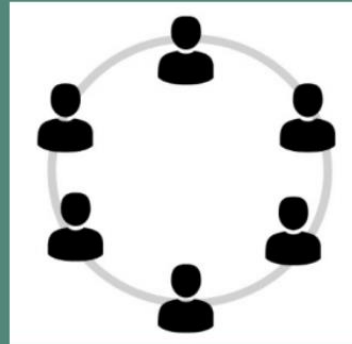


290 MW

Apple, Akamai, Etsy, Swiss Re



### Equal Offtaker

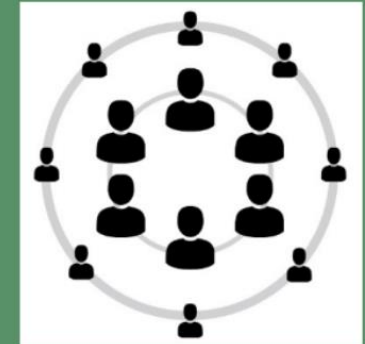


42.5 MW

Gap Inc., Workday, Cox Enterprises, Bloomberg, Salesforce



### Tiered Offtaker



240 GWh

Baltimore Regional Cooperative Purchasing Committee and 24 other participants





## Step 3: Align on desired project details

1. Lay the Groundwork

2. Form a Procurement Group

**3. Align on Desired Project Details**

4. Start the Procurement Process

5. Run the Request for Proposal

6. Negotiate and Sign Contracts

7. Share Success

### Key Decisions to Make

- Procurement type
- Resource type
- Number of projects
- Resource location
- REC ownership
- Contract length
- Operation start date
- Cost requirements
- Resource ownership
- Desired co-benefits

↑ **Flexibility**

↑ **Proposed Pricing Options**

### Potential Co-Benefits to Include in an RFP

- Local job creation and economic development
- Education and training
- Promotional opportunities
- Benefits for Indigenous Peoples
- Social inclusion for otherwise marginalized groups
- Inclusion of women and minority owned businesses
- Prevailing wage, union labor
- Biodiversity protection

*Relevant Tools: Procurement Alignment Tool, Risk Mitigation Primer*

## Step 3: Align on desired project details

1. Lay the  
Groundwork

2. Form a  
Procurement Group

3. Align on Desired  
Project Details

4. Start the  
Procurement Process

5. Run the Request  
for Proposal

6. Negotiate and Sign  
Contracts

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### Current items for consideration:

- 75 – 150 MW
- 400 acres of land needed
- involvement of third-party funder / developer
- land: better as one parcel or many?
- land: cost implications if land is donated?
- land: interconnection limitations?

## Step 4: Start the procurement process

1. Lay the Groundwork

2. Form a Procurement Group

3. Align on Desired Project Details

**4. Start the Procurement Process**

5. Run the Request for Proposal

6. Negotiate and Sign Contracts

7. Share Success



### Second Pitch to Senior Leaders

- Progress towards climate and energy goals
- Economic and social benefits
- Procurement partners
- RFP criteria and evaluation process
- Financial analysis
- Project details (even if still under consideration):
  - Project size
  - Procurement method
  - Resource type
  - Project location(s)



### Growing and Managing the Group

- Update or sign a Participant Agreement before issuing an RFP:
  - Who are involved
  - How the RFP will be managed
  - Who will select the supplier



*Relevant Tools: Aggregation Pitch Deck Template*

## **Current status of Columbia cohort:**

- Need cost estimate before we can recruit more organizations or start RFP process
- Currently waiting on Dominion
  - Based on deal points, Dominion is modelling cost in 10MW increments
  - Cost neutrality is not likely according to Dominion
- To date no official MOUs, good faith negotiations

## Step 5: Run the request for proposal (RFP)

1. Lay the Groundwork

2. Form a Procurement Group

3. Align on Desired Project Details

4. Start the Procurement Process

**5. Run the Request for Proposal**

6. Negotiate and Sign Contracts

7. Share Success



### Examples of information to include in a request for proposal (RFP)



Annual electricity load (group combined and individual)



Hourly load profile of each buyer



A separate contract with each buyer



Description of what each buyer can customize in a template contract



RFP evaluation process and evaluation committee members

#### *Relevant Tools:*

- *Off-site PPA RFP Template*
- *Aggregated RFP Template (forthcoming)*
- *Solar and Wind Off-site PPA Economic Calculator (SWOPEC)*



## Step 6: Negotiate contract terms, get final approval, and sign separate contracts

1. Lay the Groundwork

2. Form a Procurement Group

3. Align on Desired Project Details

4. Start the Procurement Process

5. Run the Request for Proposal

**6. Negotiate and Sign Contracts**

7. Share Success

### Negotiate Contract Terms

- Negotiate and sign term sheet
- Develop template contract
- Individually review the contract
- Make additional modifications if needed

### Risks to Keep in Mind

- Price risk
- Volume risk
- Construction risk
- Operational risk
- Reputational risk
- Curtailment risk
- Termination/Default risk

### Final Pitch to Senior Leaders

- Benefits of the deal on your organization and community
- Updated partner information
- Governance structure
- Project type and size

## Step 7: Share success

1. Lay the Groundwork

2. Form a Procurement Group

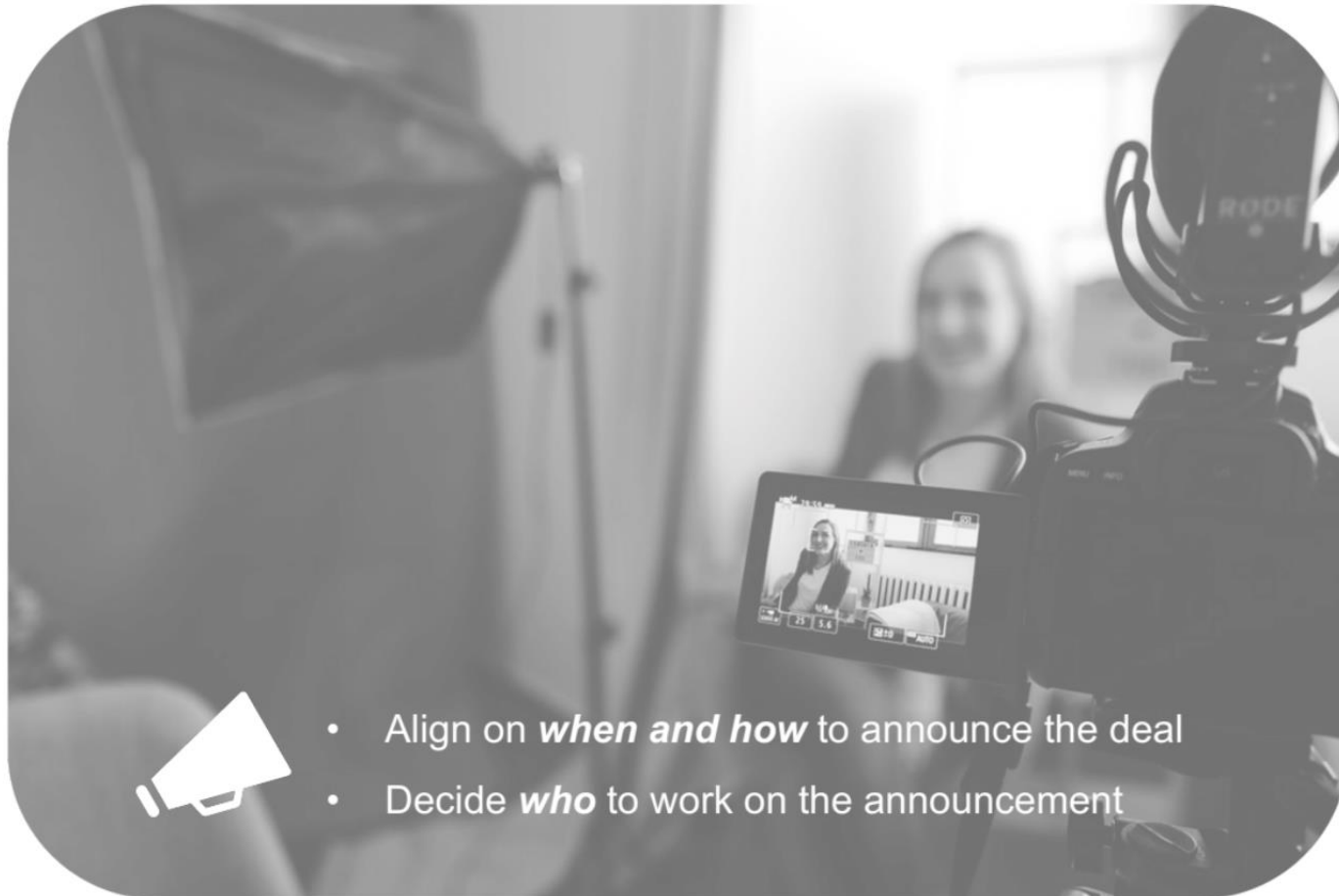
3. Align on Desired Project Details

4. Start the Procurement Process

5. Run the Request for Proposal

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7. Share Success



- Align on ***when and how*** to announce the deal
- Decide ***who*** to work on the announcement

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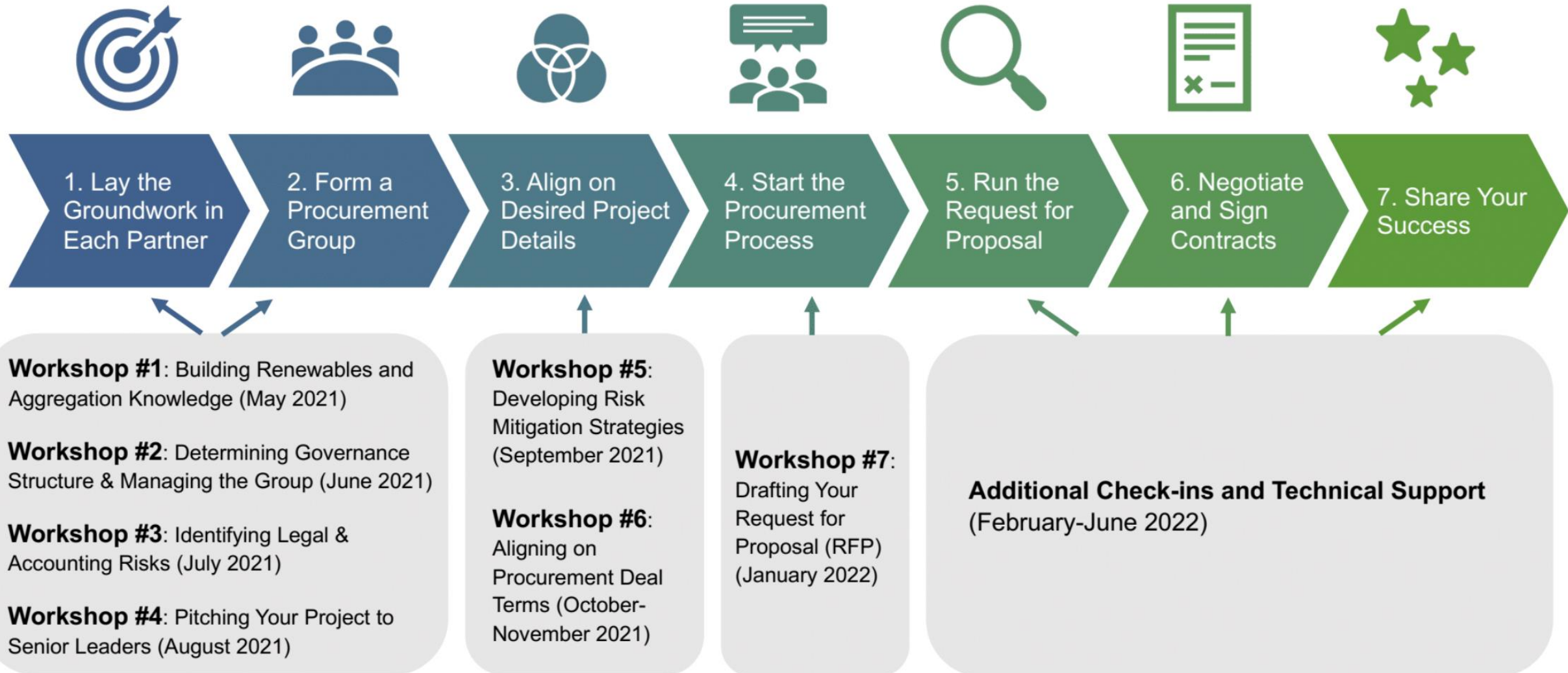
### Melbourne Example

After completing their first aggregated deal, the City of Melbourne, Australia wrote a [case study](#) about aggregated PPAs and published their RFP [online](#) to serve as an example to others.

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## Our cohort workshops will walk you through the seven-step procurement process



## **Benefits of this WRI / RMI training:**

- Free!!
- Walks you through the issues to consider
- Draft pitch decks
- One-on-one guidance at critical points during process
- Staff are great resources
- Well paced (~1 meeting a month). Keeps you focused.

## **Challenges:**

- A lot of details to learn
- Dominion is not as eager as the cohort to add more solar
- SLOW process!!

## **Benefits of a cohort:**

- Develops new working relationships, which may translate to other procurement processes
- Stronger ask due to larger group

## **Considerations for a cohort:**

- Group dynamics – need buy-in, trust, and leader(s)
- Need a leader organization
- Need a project facilitator lead
- Procurement laws may restrict certain types of research

My hope?

2024: cost neutral >75 MW of solar in the Midlands will be built for this cohort



# Columbia solar cohort

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Dr. Lori Ziolkowski

University of South Carolina

Former chair of city of Columbia's Climate  
Protection Action Committee

Thank you!  
Questions?

[loriz@sc.edu](mailto:loriz@sc.edu)





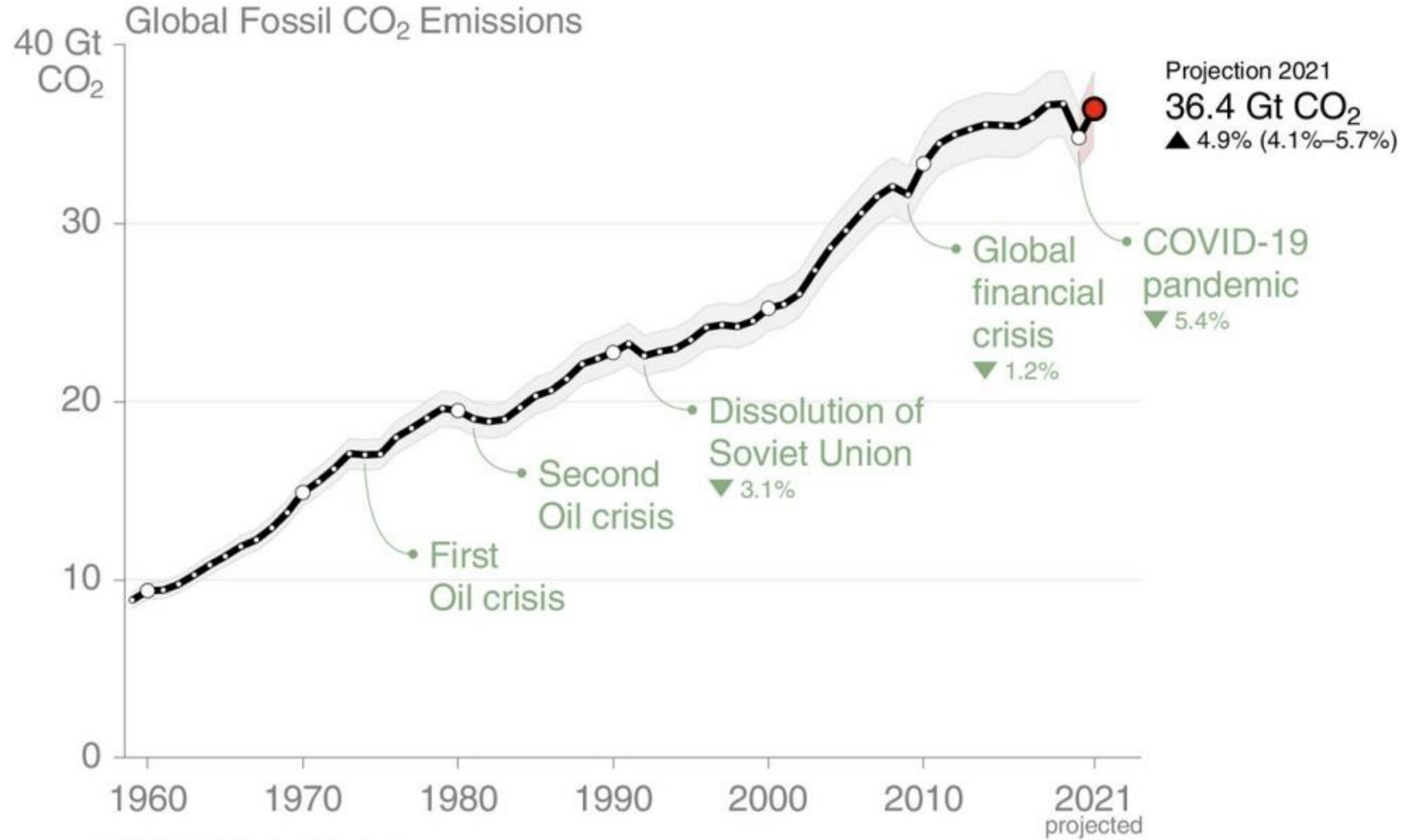


# **2022 Tri-Association Conference Speaker Recognition**

***Thank You!***

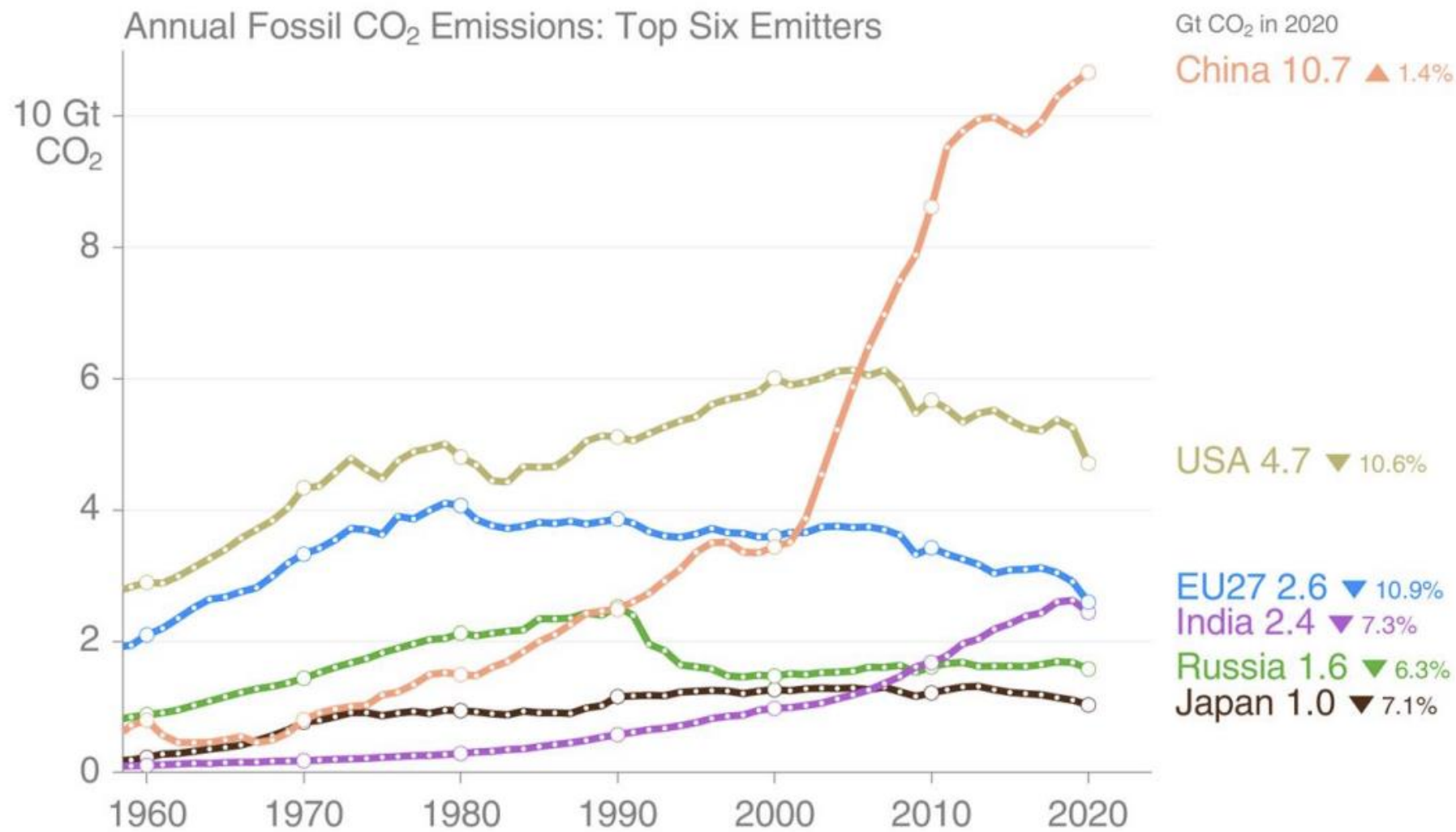


A donation to SC State Parks Beautiful Places Alliance has been made in your name.





The top six emitters in 2020 covered 66% of global emissions  
China 31%, United States 14%, EU27 7%, India 7%, Russia 5%, and Japan 3%



Countries have a broad range of per capita emissions reflecting their national circumstances

